ADAPTABILITY SCREENING: DEVELOPMENT AND INITIAL VALIDATION OF THE RECRUITING BACKGROUND QUESTIONNAIRE (RBQ)

JAN 25 1984
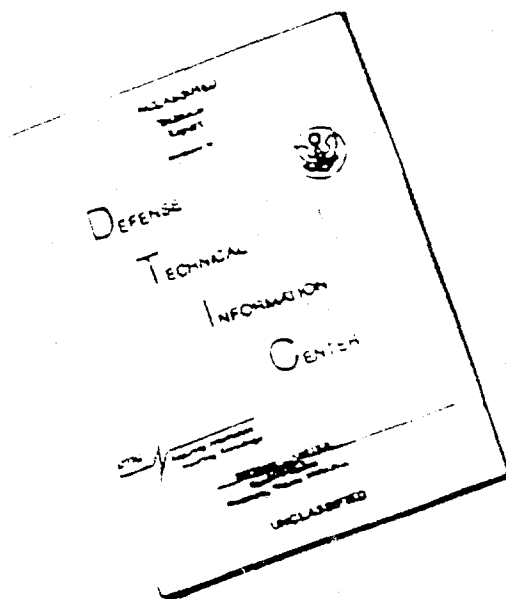
NAVY PERSONNEL RESEARCH
AND
DEVELOPMENT CENTER
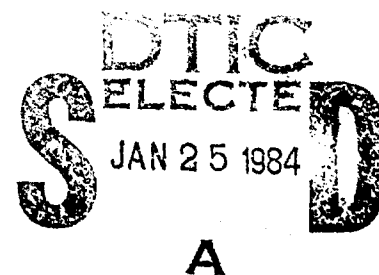San Diego, California 92152

84 01 25   030

DISCLAIMER NOTICE

THIS DOCUMENT IS BEST QUALITY AVAILABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

ADAPTABILITY SCREENING: DEVELOPMENT AND INITIAL VALIDATION OF THE RECRUITING BACKGROUND QUESTIONNAIRE (RBQ)

David C. Atwater
Norman M. Abrahams

Reviewed by
Martin F. Wiskoff

Released by
J. W. Renard
Captain, U.S. Navy
Commanding Officer

DTIC
ELECTE
JAN 2 5 1984

A

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER NPRDC TR 84-11	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) ADAPTABILITY SCREENING: DEVELOPMENT AND INITIAL VALIDATION OF THE RECRUITING BACKGROUND QUESTIONNAIRE (RBQ)		5. TYPE OF REPORT & PERIOD COVERED Interim Technical Report 1 Dec 1979–30 Sep 1982
		6. PERFORMING ORG. REPORT NUMBER 62-83-8
7. AUTHOR(s) David C. Atwater Norman M. Abrahams		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Navy Personnel Research and Development Center San Diego, California 92152		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS ZF63-521-001-030-03.02
11. CONTROLLING OFFICE NAME AND ADDRESS Navy Personnel Research and Development Center San Diego, California 92152		12. REPORT DATE December 1983
		13. NUMBER OF PAGES 22
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Adaptability screening
Background questionnaire

Enlisted selection
Attrition

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The purpose of this effort was to develop and validate a background questionnaire that would differentiate applicants for enlistment on the basis of their propensity to complete their obligated service. Two forms of the Recruiting Background Questionnaire (RBQ) were developed and administered to applicants. Those who joined the Navy (N = 15,434) have been followed through 6 months of service. RBQ scores and the attrition measures correlated most highly in the male high school graduate sample,

DD FORM 1473 EDITION OF 1 NOV 65 IS OBSOLETE
1 JAN 73
S/N 0102- LF- 014- 6601

and at lower, though still significant levels, for the male non-high-school graduates and for females. A composite of RBQ scores and SCREEN table scores correlated at higher levels than did scores for either instrument when used alone.

FOREWORD

This research was conducted under project 62763N (Personnel and Training Technology) in support of advanced development subproject ZF63-521-001 (Manpower and Personnel Technology). It was sponsored by the Chief of Naval Operations (OP-135).

This report describes the development and the initial validation of a background questionnaire to differentiate applicants for enlistment on the basis of their propensity to complete their initial tour of duty. A final report will be issued after the subjects have completed 18 months of service.

Appreciation is expressed to Mr. R. Hoshaw (OP-135) for his support throughout the project, and to LT J. Pfeiffer, Military Enlisted Processing Command, for coordinating the testing at the military entrance processing stations.

J. W. RENARD
Captain, U.S. Navy
Commanding Officer

J. W. TWEEDDALE
Technical Director

SUMMARY

Problem

The Navy has experienced continuing and, at times, severe, premature attrition of first-term enlistees. Presently, such losses are exacerbated by the declining population of military age youth. These problems can be ameliorated by identifying and selecting applicants who are more likely to complete their enlistments.

Objectives

The objectives of the research reported here were to (1) develop and validate a comprehensive background questionnaire to differentiate recruit applicants on the basis of their propensity to complete their first term of service and (2) evaluate the questionnaire as a possible supplement to operational attrition screening devices.

Approach

The Recruiting Background Questionnaire (RBQ), developed for this research, contains personal history questions designed to elicit information on school and job experiences, family life, hobbies, and interests. The RBQ was administered to a sample of Navy applicants at each continental United States military entrance processing station. Applicants who entered the Navy were tracked through 6 months of service to identify those who left the service prematurely. The questionnaire was validated against attrition criteria to identify background factors that differentiated survivors from premature losses. Criterion data were collected after the cohort completed recruit training and again after 6 months of service.

Results

Scoring keys developed for the RBQ correlated significantly with attrition measured after recruit training and after 6 months of service. The RBQ correlated most highly with the criterion in the male high school graduate samples ($r = .28$ to $.38$) and in the minority samples ($r = .28$ to $.34$). It correlated at lower, though still significant levels, for male nongraduates ($r = .17$ to $.21$) and for females ($r .18$ to $.26$). When combined with the operational enlisted screening device--the SCREEN table--in a multiple regression analysis, the combined SCREEN plus RBQ score correlated at significantly higher levels than did the SCREEN score alone.

Conclusion

The RBQ shows promise of being a usable attrition screening device, particularly when used in conjunction with SCREEN scores.

Recommendations

1. The cohort used for analysis in this research should be tracked through at least 18 months of service, and development and validation of scoring keys should be repeated at that point. Validation at 18 months of service will provide larger attrition groups (attrition rates are projected to be double the 6-month rate), which will facilitate development of stable keys to predict attrition in the critical non-high-school graduate population.

2.   This 18-month validation should include criteria in addition to attrition, such as promotion history, technical school and job performance, disciplinary actions, and attrition by type of loss. Scoring keys developed at the 18-month point should be of optimal length and not restricted to 100-item responses as in the preliminary validation.

3.   Decisions regarding operational use of RBQ should await the 18-month validation. Implementation decisions may also be affected by recent DoD interest in developing and implementing a joint-service background questionnaire.

CONTENTS

LIST OF TABLES

INTRODUCTION

Problem and Background

High attrition rates for first-term enlistees have been a chronic problem for the Navy. During FY81, for example, more than 20,000 enlistees were separated from the Navy before they completed their initial service obligation and were not eligible to reenlist (Navy Military Personnel Command, 1981).

Premature losses of such magnitude create a number of problems for the Navy. Financial costs are certainly one of the most critical concerns. According to a conservative 1979 estimate, it would cost more than 160 million dollars to recruit and train 20,000 replacements or $8,000 per person (McConnell & McNichols, 1979). Monetary facators, however, may not be the most pressing issue. Forecasts for a shrinking recruitment propulation portend increasing difficulties in meeting recruiting goals and, thus, in maintaining fleet personnel requirements. Reductions in early first-term attrition would result in financial savings, ease recruiting demands, and would increase the average experience level of force personnel.

There are a number of possible strategies for reducing attrition (e.g., training and intervention techniques, monetary inducements). One promising and cost-effective approach involves selecting, from available and qualified applicants, those most likely to remain in the service. Historically, enlisted selection procedures have emphasized intellectual screening devices, such as aptitude tests that identify the applicants most likely to complete technical training successfully. While these tests are valid predictors of school performance, they are not highly related to nonacademic attrition. More recently, the services have turned toward the use of other measures to improve prediction of attrition. The move in this direction has received impetus from industry, where research has demonstrated that instruments such as background (or biographic) questionnaires can be valid predictors of complex criteria such as job performance, creativity, and tenure (Asher, 1972; Chaney & Owens, 1964; Schuh, 1971).[1]

An early result of the Navy's interest in this area was the Odds for Effectiveness (OFE) table (Sands, 1976), now superseded by the currently operational Success Chances for Recruits Entering the Navy (SCREEN) table. These tables use a limited number of background items (e.g., age and number of dependents) combined with academic measures (e.g., educational attainment and Armed Services Vocational Aptitude Battery (ASVAB) scores) to make an actuarial prediction of the likelihood of an enlistee completing the first year of service. While the SCREEN procedure is valid, continuing high attrition rates suggest that additional attrition screening approaches be examined. A mere reduction of 1 percent in the number of first-term attritees could save nearly $1.5 million annually (McConnell & McNichols, 1979).

---

[1]Further impetus has resulted from a recent General Accounting Office report (1982) strongly endorsing the continuation and expansion of such instruments to reduce enlisted attrition in all services.

Objectives

The objectives of the research reported here were to (1) develop and validate a comprehensive background questionnaire to differentiate recruit applicants on the basis of their propensity to complete their first term of service, and (2) evaluate the questionnaire as a possible supplement to operational attrition screening devices.

APPROACH

Instruments

Development of the Recruiting Background Questionnaire (RBQ) began in 1975, when 370 biographical items were administered to recruits at the Naval Training Center, San Diego (Atwater, Skrobiszewski, & Alf, 1976). The recruits were tracked and the items validated against a survival/attrition criterion after they had completed recruit training and again after they had completed approximately 2 years of service. The 70 valid items identified by Atwater et al., plus valid items from background questionnaires being developed by the Army and Air Force, were used to construct RBQ, Forms 1 and 2. These items, which address topics such as work and school experiences, hobbies, interests, and family history, are in multiple-choice format with from three to five alternatives. Each form of the RBQ contains 55 items, 30 of which appear on both forms. The RBQ requires about 25 minutes to complete. Sample items are contained in the appendix.

Subjects

From December 1979 through June 1980, Military Enlistment Personnel Command personnel at all continental United States military entrance processing stations (MEPS--formerly called armed forces examining and entrance stations) administered the RBQ to 29,464 applicants for Navy enlistment. Those with social security numbers (SSNs) ending in odd digits were given Form 1; and those with SSNs ending in even digits, Form 2. Of the total sample, 15,430 applicants subsequently joined the Navy and their records were included in the Navy Recruiting Command's Accession Recruiting System (ARS) master file (formerly referred to as the SCAT file). Of this sample, 7,888 (51%) had taken RBQ Form 1; and 7,542 (49%), Form 2. The total sample is described more fully in Table 1.

Criteria

The basic criterion for this research was an attrition measure. Subjects who left the Navy before completing their obligated service for reasons reflecting "failure to adapt" were assigned low-criterion status; and those who remained, high-criterion status. Attritees who terminated their service for certain nonperjorative causes were excluded from the analyses. These causes include preexisting medical conditions, accidents, disabilities, death, and transfers to officer training programs.

Criteria for the RBQ validation were gathered at the completion of recruit training and again approximately 6 months afterwards. Recruit training attrition data were obtained from the ARS file; and the 6-month data, from the Enlisted Survival Tracking File (STF).[2]

---

[2]STF was developed by NAVPERSRANDCEN in collaboration with the Navy Military Personnel Command (NMPC-16) (Gay & Borack, 1981, 1982) and is maintained at the Argonne National Laboratories, Argonne, Illinois.

Table 1

Description of Sample (N = 15,430) by RBQ Form

Characteristic	Form 1 N	Form 1 %	Form 2 N	Form 2 %	Total N	Total %
Sex						
Male	7,063	89.5	6,765	89.7	13,828	89.6
Female	825	10.5	777	10.3	1,602	10.4
Total	7,888	100.0	7,542	100.0	15,430	100.0
Education (Males Only)[a]						
NHSG	1,456	20.6	1,427	21.1	2,883	20.8
HSDG	4,796	67.9	4,565	67.5	9,361	67.7
HSGED	665	9.4	641	9 5	1,306	9.4
HSDG+	118	1.7	94	1.4	212	1.5
Missing data	28	0.4	38	0.6	66	0.5
Total	7,063	100.0	6,765	100.1	13,828	99.9
Race (Males Only)						
Caucasion	5,936	84.0	5,715	84.5	11,651	84.2
Black	923	13.1	858	12.7	1,781	12.9
Other minority	204	2.9	192	2.8	396	2.9
Total	7,063	100.0	6,765	100.0	13,828	100.0

[a]Non-high-school graduates (NHSG); high school graduates with diplomas (HSDG); high school graduates with general equvalency diploma (HSGED); high school graduates with some college education (HSDG+).

The total attrition rate for the sample at the completion of recruit training was 8.1 percent. After removal of those attriting for nonperjorative causes, the rate was 5.9 percent. After 6 months of service, the total and adjusted attrition rates were 15.7 and 11.9 percent respectively.

Scoring Key Development

Separate scoring keys were developed for each RBQ form. Approximately 60 percent (N = 8,328) of the male subjects were randomly assigned to key development samples; and the remainder (N = 5,500) to holdout samples for cross-validation purposes. The Navy Personnel Research and Development Center's (NAVPERSRANDCEN's) KEYCON program (Abrahams, Neumann, & Rimland, 1973) was used to select items for the scoring keys by comparing the percentage of persons in the high-criterion group (nonattritees) and the

percentage of those in the low-criterion group (attritees) who chose each item alternative. The difference between these two percentages, commonly called the percent difference, was used to select the item alternatives for inclusion in the scoring key. To permit comparisons between keys on different RBQ forms or on the same form with different subject pools, the number of keyed item responses was held constant at 100. This was not the optimum number of responses to maximize the validity of each key, but it approaches optimality across all keys.

Initially, four scoring keys were developed, two for each RBQ form. Keys RTC-1 and RTC-2 were developed on RBQ, Forms 1 and 2 respectively, at the completion of recruit training. Keys 6M-1 and 6M-2 were developed on Forms 1 and 2 when the cohort had completed an additional 6 months of service.

Statistical Analyses

The four scoring keys were cross-validated in their respective holdout samples. The holdout samples were also split into homogeneous subgroups based on education level and race, and the keys cross-validated in these subgroups. Biserial correlations between RBQ scores and the dichotomized criterion (attritee/nonattritee) were obtained from these cross-validation subgroups.

Operational SCREEN scores were obtained for all subjects who had taken RBQ, Form 1. SCREEN scores were then correlated with the same attrition criterion in the male cross-validation sample.

Finally, stepwise multiple regression analyses were performed to determine the incremental validity for RBQ scores when used in conjunction with SCREEN scores.

RESULTS AND DISCUSSION

Development and Cross-validation of Scoring Keys

Table 2 presents biserial correlations in the key development and holdout samples for the four scoring keys. These correlations were not corrected for the indirect restriction in range of RBQ scores resulting from the enlisted selection process. The restriction problem is addressed later in this report (see pp. 7-8).

The male holdout samples were next separated into subgroups based on high school graduation status and race. The female sample, which had not been used in the key development phase, was used in this cross-validation phase. Table 3 presents the correlations obtained when the scoring keys were applied to these homogeneous subgroups. It also provides sample sizes, attrition rates, means, and standard deviations (SDs) for these subgroups.

The lower correlations shown in Table 3 for the male non-high-school graduates (NHSGs) and females were not surprising, since the four scoring keys were developed on samples that were predominantly high school graduates with diplomas (HSDGs) and exclusively male. Therefore, separate keys were developed and cross-validated using the NHSG and female samples. Correlations for these keys, presented in Table 4, indicate no consistent advantage for these sample-specific keys over the keys developed on the total sample. The results in Table 4, high correlations in the key development samples and extreme shrinkage in the cross-validation samples, may be the result of the relatively small cross-validation sample, coupled with a low proportion of attritees.

4

Table 2

Biserial Correlations of Scoring Keys in Key Development and Cross-validation Samples

Scoring Key	Key Development Sample		Cross-validation Sample		Total
	r	N	r	N	N
Developed at completion of recruit training:					
RTC-1 (Form 1)	.405*	4,263	.295*	2,800	7,063
RTC-2 (Form 2)	.408*	4,065	.304*	2,700	6,765
Total		8,328		5,500	13,828
Developed when cohorts had completed 6 months of service:					
6M-1 (Form 1)	.377*	4,183	.298*	2,743	6,926
6M-2 (Form 2)	.372*	4,014	.267*	2,680	6,694
Total		8,197		5,423	13,620

*$p < .001$.

Table 3

Data for Scoring Keys in Cross-validation Samples

Scoring Key/Sample	Biserial Correlation	Sample Size	Attrition Rate	Mean	SD
RTC-1 (Form 1):					
Education level (Male):					
HSDG	.295**	1,987	4.3	117.1	6.7
NHSG	.207*	556	8.9	107.8	6.1
Race (Male):					
Caucasion	.287**	2,334	5.4	113.8	7.5
Minority	.342**	466	6.0	112.8	7.1
Black	.367**	382	6.0	112.9	7.2
All females	.176**	799	10.9	113.4	6.6
RTC-2 (Form 2):					
Education level (Male):					
HSDG	.381**	1,823	5.4	117.7	6.8
NHSG	.205*	579	8.6	106.8	7.5
Race (Male):					
Caucasion	.288**	2,258	6.4	114.6	8.8
Minority	.323**	442	7.7	113.9	7.1
Black	.349**	347	6.3	113.8	7.0
All females	.217*	756	12.2	118.0	7.4
6M-1 (Form 1):					
Education level (Male):					
HSDG	.281**	1,937	8.8	118.2	7.4
NHSG	.198*	535	17.6	104.7	6.0
Race (Male):					
Caucasion	.270**	2,288	9.7	114.7	8.9
Minority	.332**	455	9.7	114.1	7.3
Black	.359**	364	8.2	114.0	7.3
All females	.174*	777	17.3	115.0	7.2
6M-2 (Form 2):					
Education level (Male):					
HSDG	.305**	1,783	10.4	118.7	6.8
NHSG	.174*	562	17.3	107.6	7.3
Race (Male):					
Caucasion	.252**	2,151	10.7	115.6	8.8
Minority	.284**	429	10.0	114.6	6.7
Black	.262**	344	9.8	114.9	6.8
All females	.266**	751	18.1	118.1	7.4

Note. In some cases, RTC sample sizes are reduced due to missing educational and race codes. Also, sample sizes are reduced from RTC to the 6-month point due to additional nonprejorative losses and expiration of enlistments.

*$p < .01$.

**$p < .001$.

Table 4

Biserial Correlations of Scoring Keys Developed on NHSG (Male) and Female Samples

Scoring Key	Key Development Sample		Cross-validation Sample	
	r	N	r	N
NHSG-1	.588*	921	.261*	535
NHSG-2	.472*	865	.167*	562
FEM-1	.575*	466	.214*	211
FEM-2	.551*	451	.178*	200

Note. Six-month criterion data were used in this analysis. All correlations are biserial.
*$p < .01$.

The lower validity in the NHSG and female subgroups may also partially be a function of RBQ items that are inappropriate for these subjects. The original selection of the items to comprise RBQ (Atwater et al., 1976) was made on the basis of item validities in a male, predominantly HSDG sample. The preliminary item selection procedure tended to favor inclusion of educationally related items, because education status correlates with attrition. Nearly one third of the items in each form of RBQ are school-related.

The possibility of inappropriate items was investigated for scoring key 6M-2 by separating items into school-related (SR) and non-school-related (NSR) items. As Table 5 shows, the NSR items correlated at similar, moderate levels for both HSDG and NHSG samples. However, the SR items differed markedly for the two groups, with the NHSGs having much lower means and correlations. This finding suggests that the SR items contribute little to the validity of scoring keys for NHSGs. It also helps clarify the large differences in correlations for HSDG and NHSG samples on the original scoring keys (see Table 3).

It should be noted that the correlations reported in Tables 3 and 4 for Form 6M-2 scoring keys in the NHSG samples are lower than the corresponding correlations for NSR items given in Table 5. This finding strongly indicates that further work on key development for NHSGs should focus on developing additional items unrelated to education.

Comparison of RBQ and SCREEN Scores

While RBQ scoring keys cross-validated at statistically significant levels, they must be evaluated within the context of existing selection procedures. Therefore, to gauge their potential usefulness, RBQ attrition predictions were compared to SCREEN score predictions. SCREEN scores were obtained for all recruits who took RBQ, Form 1, and then correlated against 6-month criterion data, using the male cross-validation samples. Table 6 provides the comparison of validations for SCREEN and RBQ. To ensure an equitable comparison between SCREEN and RBQ, it was necessary to adjust the obtained

Table 5

Comparison of School-related (SR) and Non-school related (NSR)
Items from Scoring Key 6M-2

Sample/Status	All Items Key 6M-2 (N = 100)			SR Items (N = 38)			NSR Items (N = 60)		
	X	SD	r_{Bis}	X	SD	r_{Bis}	X	SD	r_{Bis}
HSDG:									
Nonattrites (N = 1,597)	119.1	6.9		107.6	3.2		111.1	4.9	
			+.305			+.242			+.264
Attrites (N = 186)	115.0	7.2		106.1	3.5		108.5	5.1	
NHSG:									
Nonattrites (N = 465)	108.0	7.5		99.8	4.0		108.0	5.1	
			+.175			+.068			+.200
Attrites (N = 97)	108.6	7.6		99.3	4.1		106.2	5.4	

correlations for the effects of selection since SCREEN scores were one of the factors used in selecting this sample and are, therefore, probably restricted to a greater degree than are RBQ scores. Formulas from standard texts (Guilford, 1965, pp. 342-345) were used to correct the sample correlations to obtain estimates of the validities that would be expected in an applicant population. It should be noted that these correction formulas assume direct selection on SCREEN and indirect selection on RBQ. These assumptions are not met precisely, inasmuch as SCREEN is only one element in the selection process and, consequently, is not subject to direct selection as implied by the formula. Violation of this assumption will generally result in conservative estimates of the correlations expected in an applicant population (Linn, Harnisch, & Dunbar, 1981). Although these estimates are conservative, they should be more accurate than the uncorrected correlations. As shown in Table 6, after these correlations have been applied to all correlations, SCREEN scores and RBQ scores correlated at about the same level with the attrition measure.

A multiple correlation analysis was also performed on this data set to determine whether a composite based on SCREEN and RBQ would result in significantly higher correlations with attrition than would SCREEN scores alone. Results in Table 6 show that there is a significant improvement, not only in the total sample but also in the HSDG and NHSG samples. Improvements in reducing attrition by using SCREEN plus RBQ, rather than using SCREEN alone, can be estimated from the sample data and the Taylor-Russell tables (Taylor & Russell, 1939). These tables show that using SCREEN plus RBQ score at the 6-month point would reduce HSDG attrition by slightly less than 1 percent and NHSG attrition by about 1.5 percent. As mentioned earlier, a 1 percent reduction in attrition translates into a $1.5 million savings. Greater savings could be anticipated if they were computed over the full first term of service.

Table 6

Correlations of RBQ and SCREEN with 6-month
Attrition Criterion

Sample	RBQ		SCREEN		SCREEN + RBQ	
	r	r_c^a	r	r_c	R	R_c
All males (N = 2,743)	.298	.363	.282	.365	.339*	.404
Male HSDG (N = 1,937)	.281	.287	.256	.268	.299*	.348
Male NHSG (N = 535)	.198	.233	.147	.233	.251*	.302

Note. Sample from the Form 1 cross-validation sample.

[a] Correlations corrected for restriction in range.

*Significantly greater than the corresponding correlation for SCREEN using an F test for the difference between multiple Rs (p < .001).

Possible Strategies for Using RBQ

Several possible strategies for employing RBQ are available. Administering RBQ to all applicants would result in the largest reduction in attrition, about 2 percent. The cost saving from this reduction would, however, be somewhat offset by the cost of administering RBQ to all applicants.

Administering RBQ to selected high-risk applicants may be more cost effective. The Army, for example, is currently screening all 17-year-old male NHSGs with a background questionnaire, the Military Appliant Profile (MAP). A modification of this method suggested by our data would involve administering RBQ to applicants with marginal SCREEN scores. The sample data have shown a wide range of RBQ scores for every SCREEN score. Figure 1 illustrates the potential value of RBQ scores for recruits with low SCREEN scores. It shows actual attrition rates for all males in the Form 1 cross-validation sample who had SCREEN scores of 75 or less. Within this low SCREEN score group, recruits with high RBQ scores had an attrition rate of 7.7 percent, while those with low RBQ scores had a rate of 20 percent. These findings suggest a two-stage selection strategy: (1) applicants are first qualified on SCREEN, and (2) those with low SCREEN scores then take RBQ. Applicants with low SCREEN scores, possibly even those with scores below the SCREEN cutoff, could be accepted for enlistment on the basis of satisfactory RBQ scores.
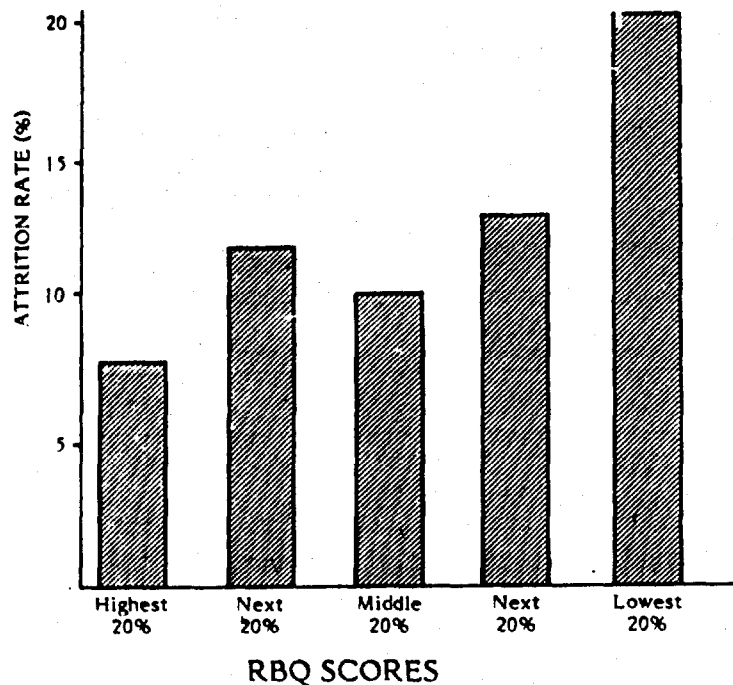
Figure 1.   Attrition rates for male enlistees with SCREEN scores
of less than 76.

CONCLUSIONS

RBQ scores are significantly related to attrition measured after completion of recruit training and after an additional 6 months of service. The RBQ works well with HSDG and minorities, but less well with NHSG and females. An RBQ plus the SCREEN composite correlates with attrition more highly than does either alone.

An economical use of RBQ suggested by the data would be to administer RBQ to applicants who are NHSGs or to those who fail to qualify on the basis of SCREEN. RBQ plus SCREEN would provide additional information about these marginally qualified applicants and could make more of them available for selection.

RECOMMENDATIONS

1.   The cohort used for analysis in this research should be tracked through at least 18 months of service, and development and validation of scoring keys should be repeated at that point. Validation at 18 months of service will provide larger attrition groups (attrition rates are projected to be double the 6-month rate), which will facilitate development of stable keys to predict attrition in the critical NHSG population.

2.   This 18-month validation should include criteria in addition to attrition, such as promotion history, technical school and job performance, disciplinary actions, and attrition by type of loss. Scoring keys developed at the 18-month point should be of optimal length and not restricted to 100-item responses as in the preliminary validation.

3.   Decisions regarding operational use of RBQ should await the 18-month validation. Implementation decisions may also be affected by recent DoD interest in developing and implementing a joint-service background questionnaire (GAO, 1982).

REFERENCES

Abrahams, N. M., Neuman, I., & Rimland, B. Preliminary validation of an interest inventory for selection of Navy recruiters (NPTRL SRM 73-3). San Diego: Navy Personnel and Training Research Laboratory, April 1973.

Asher, J. L. The biographic item: Can it be improved? Personnel Psychology, 1972, 25, 251-269.

Atwater, D. C., Skrobiszewski, M., & Alf, E. F. A preliminary selection of biographical items for predicting recruit attrition (NPRDC Tech. Note 76-6). San Diego: Navy Personnel Research and Development Center, May 1976.

Chaney, F. B., & Owens, W. A. Life history antecedents of sales, research, and general interest. Journal of Applied Psychology, 1964, 48, 101-105.

Gay, K. W., & Borack, J. I. The enlisted survival tracking system (STF) (NPRDC Tech. Note 81-11). San Diego: Navy Personnel Research and Development Center, April 1981.

Gay, K. W., & Borack, J. I. The enlisted survival tracking file (STF): A revision (NPRDC Tech. Note 82-27). San Diego: Navy Personnel Research and Development Center, September 1982. (AD-A119 717)

General Accounting Office (GAO). Service programs to reduce costly attrition by developing and using biodata inventories (FPCD-82-27). Washington, DC: Author, March 1982.

Guilford, J. P. Fundamental statistics in psychology and education (4th ed.). New York: McGraw-Hill, 1965.

Linn, R. L., Harnisch, D. L., & Dunbar, S. B. Corrections for range restrictions: An empirical investigation of conditions resulting in conservative corrections. Journal of Applied Psychology, 1981, 66, 655-663.

McConnell, R. D., & McNichols, G. R. Marginal pipeline costs of enlisted personnel (Tech. Rep. 7808-1). Falls Church, VA: Management Consulting and Research, Inc., December 1979.

Navy Military Personnel Command. FY-81 annual report: Navy military personnel statistics (NAVPERS 15658(A)). Washington, DC: Author, September 1981.

Sands, W. A. Development of a revised odds for effectiveness (OFE) table for screening male applicants for Navy enlistment (NPRDC Tech. Note 76-5). San Diego: Navy Personnel Research and Development Center, April 1976.

Schuh, A. J. The predictability of employee tenure: A review of the literature. Personnel Psychology, 1967, 20, 133-152.

Taylor, H. C., & Russell, J. R. The relationship of validity coefficients to practical effectiveness of tests of selection. Journal of Applied Psychology, 1939, 23, 565-578.

APPENDIX

SAMPLE RBQ ITEMS

SAMPLE RBQ ITEMS

1. In which of the following groups of social activities did you participate <u>most</u> often?

   A. Collections—stamps, coins, cards, etc.
   B. Music—orchestra, band, glee club, singing, playing instruments, etc.
   C. Art—photography, sketching, painting, etc.
   D. Woodcraft—scouting, hiking, camping, etc.
   E. None of these, or something else.

2. Of the jobs you have had, how long did you work at the job you held the longest?

   A. 5 months or less.
   B. 6-8 months.
   C. 9-11 months.
   D. 12 months or longer.
   E. I haven't had a job.

3. Which of the following describes your progress for all years of school you attended?

   A. Skipped two or more grades.
   B. Skipped one grade.
   C. Neither skipped nor failed any grades.
   D. Failed one grade.
   E. Failed two or more grades.

4. How did your parents feel on the subject of your career?

   A. Had very strong feelings and outlined what they wanted me to do.
   B. Were interested and helped me outline what I wanted to do.
   C. Were interested but did not understand what I wanted to do.
   D. Showed little or no interest.
   E. Actively opposed what I wanted to do.

5. At what age did you get a driver's license?

   A. 15.
   B. 16.
   C. 17.
   D. 18 or older.
   E. I have no driver's license.

6. How did you feel about studyng during the last two years of school?

   A. I did not do much studying because I did not want to.
   B. I did not do much studying because of other activities.
   C. I did not do much studying because it wasn't necessary.
   D. I studied hard but only before examinations.
   E. I studied regularly throughout the school year.

7. Concerning your present and future activities, do you:

   A. Make rather precise and detailed plans?
   B. Make broad and general plans but not detailed ones?
   C. Make a few plans; let "nature take its course?"

DISTRIBUTION LIST

Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics)
Chief of Naval Operations (OP-01B7) (2), (OP-13), (OP-140F2), (OP-987H)
Chief of Naval Material (NMAT 0722)
Chief of Naval Research (Code 270), (Code 440) (3), (Code 442), (Code 442PT)
Chief of Naval Education and Training (00A), (N-21)
Chief of Naval Technical Training (016)
Commandant of the Marine Corps (MPI-20)
Commander Naval Military Personnel Command (NMPC-013C)
Commander Navy Recruiting Command (Code 20)
Commanding Officer, Naval Aerospace Medical Institute (Library Code 12) (2)
Commanding Officer, Naval Technical Training Center, Corry Station (Code 101B)
Commanding Officer, Naval Training Equipment Center (Technical Library) (5), (Code N-1)
Director, Office of Naval Research Branch Office, Chicago (Coordinator for Psychological Sciences)
Commander, Army Research Institute for the Behavioral and Social Sciences, Alexandria (PERI-ASL), (PERI-ZT), (PERI-SZ)
Commander, Air Force Human Resources Laboratory, Brooks Air Force Base (Manpower and Personnel Division), (Scientific and Technical Information Office)
Commander, Air Force Human Resources Laboratory, Williams Air Force Base (AFHRL/OT), (CNET Liaison Office)
Commander, Air Force Human Resources Laboratory, Wright-Patterson Air Force Base (AFHRL/LR)
Commandant Coast Guard Headquarters
Commanding Officer, U.S. Coast Guard Research and Development Center, Avery Point
Institute for Defense Analyses, Science and Technology Division
Defense Technical Information Center (DDA) (12)